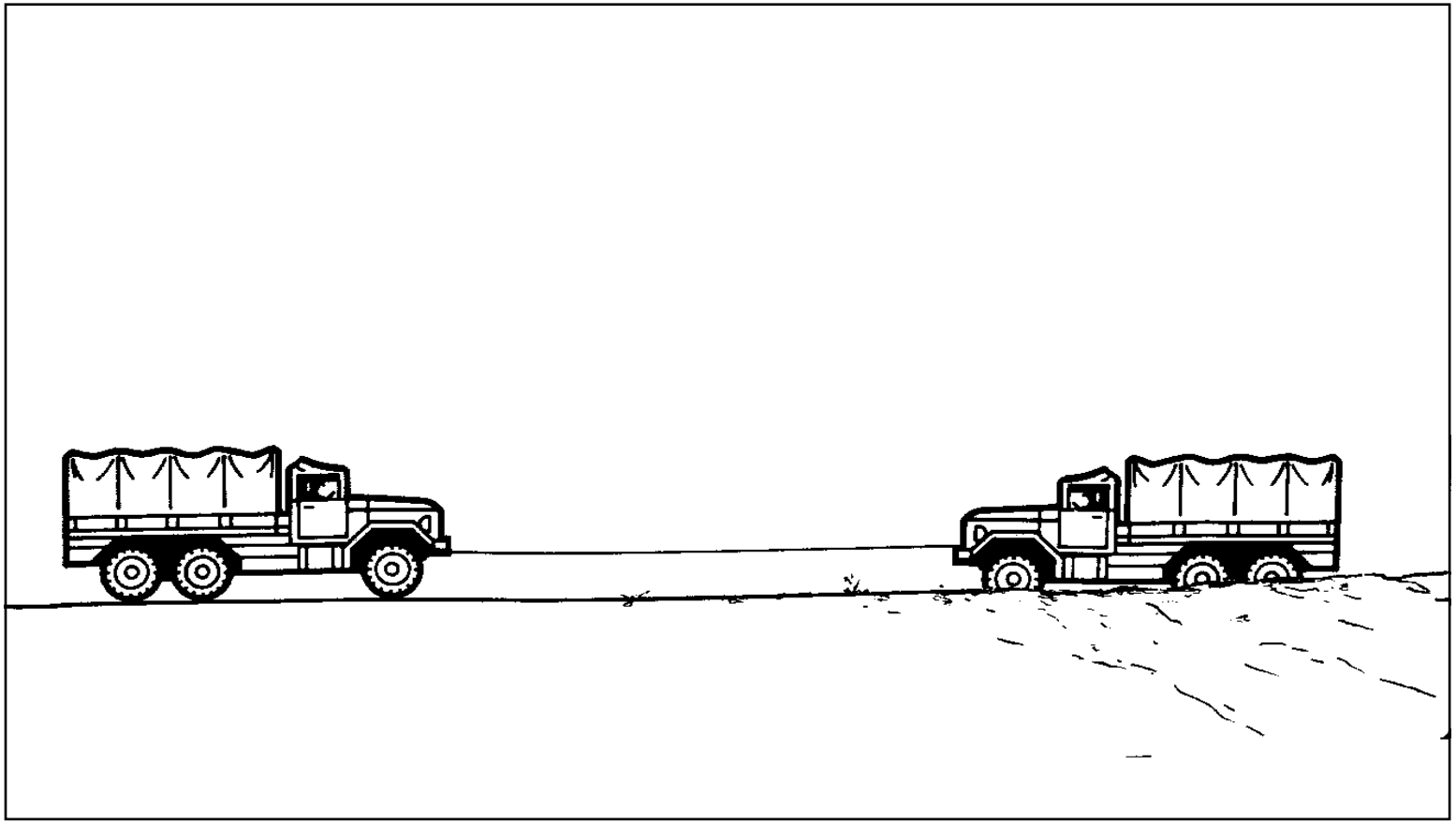
Vehicle Recovery

Recovery by winching a tactical vehicle



Objective

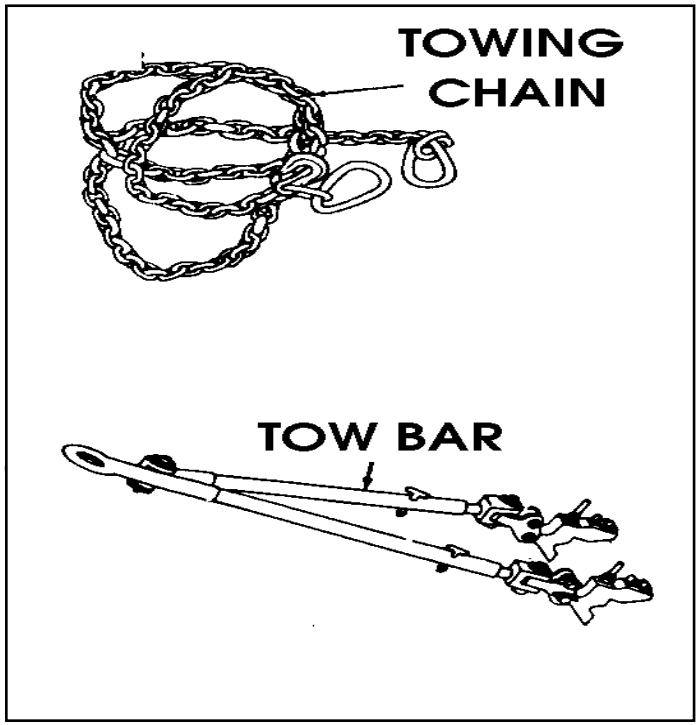
At the completion of this lesson, you (the studen
will be able to demonstrate the skills and knowl
required to recover a tactical wheeled vehicle b
winching until it is free to move under its own p
All procedures must be performed without injur
to personnel or damage to equipment or surrou

Recovery Procedure

- Reconnoiter the Area
- Estimate the situation
- Calculate the Situation
- Obtain the resistance
- Verify the

Towing Vehicle

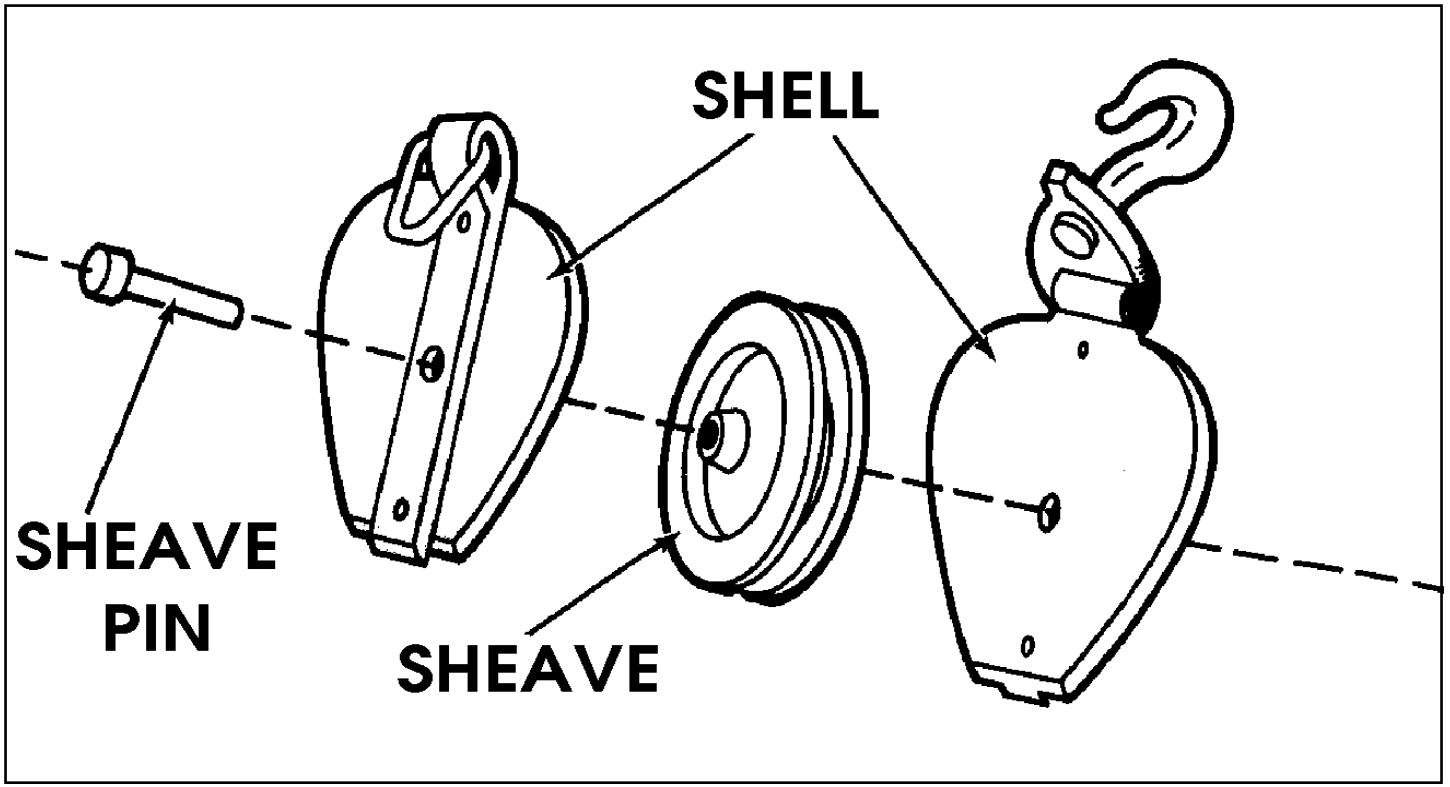
- **Refer to vehicle technical manual.**
- **Move towed loads at slow speed.**
- **Mark towing vehicle with warning lights**
- **Use a wrecker whenever possible.**
- **Use a tow bar.**
- **Connect cables, chains, or ropes to pintl**
- **In cities or heavy traffic.**
- **Proceed slowly at 5 to 10 MPH.**



- **When using a tow bar, connect a chain between the two vehicles.**
- **Be sure a driver is in every motor vehicle being towed.**

Characteristics and Types of Blocks

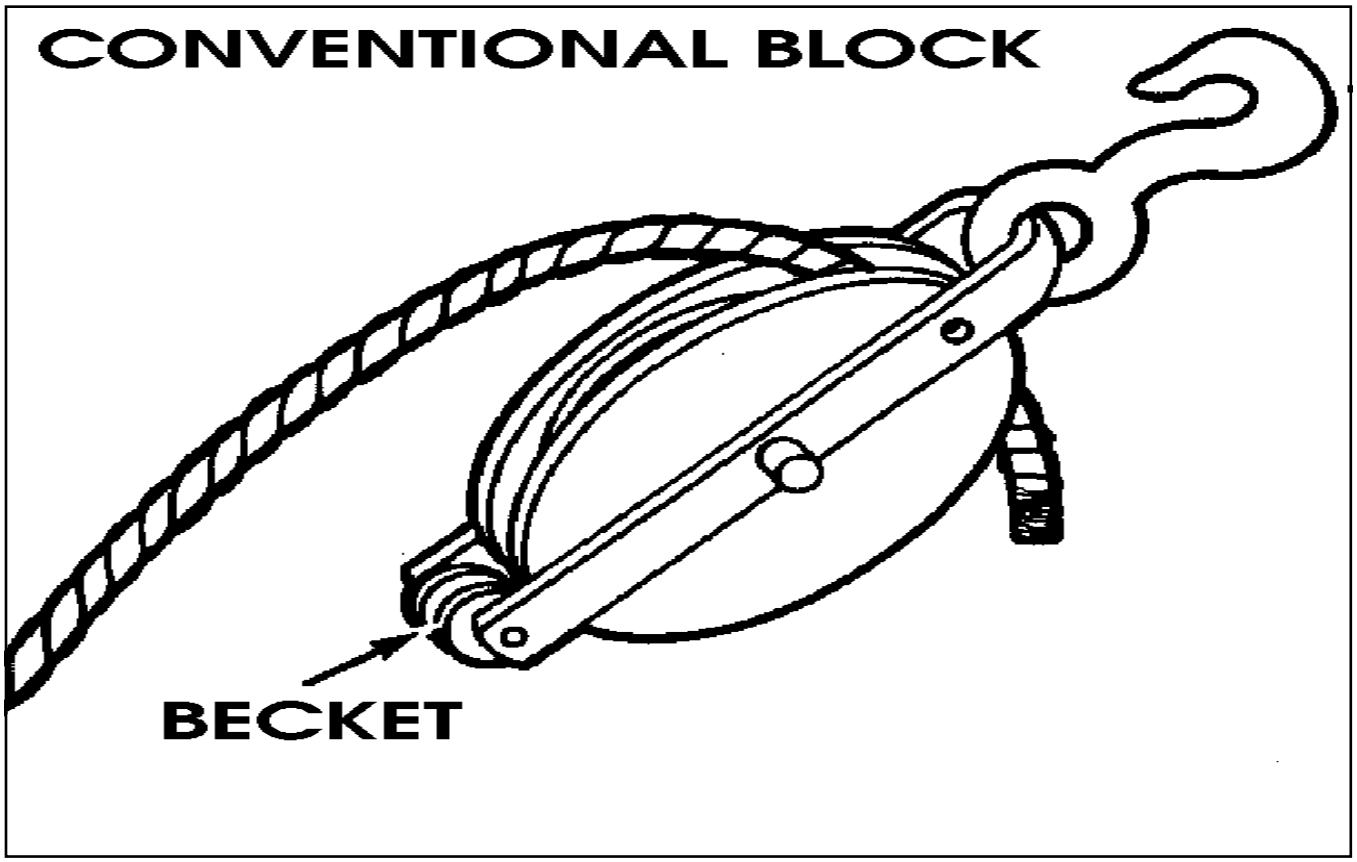
A Block consists of a shell or frame with one or grooved wheels called sheaves and a pin.



Characteristics and Types of Blocks

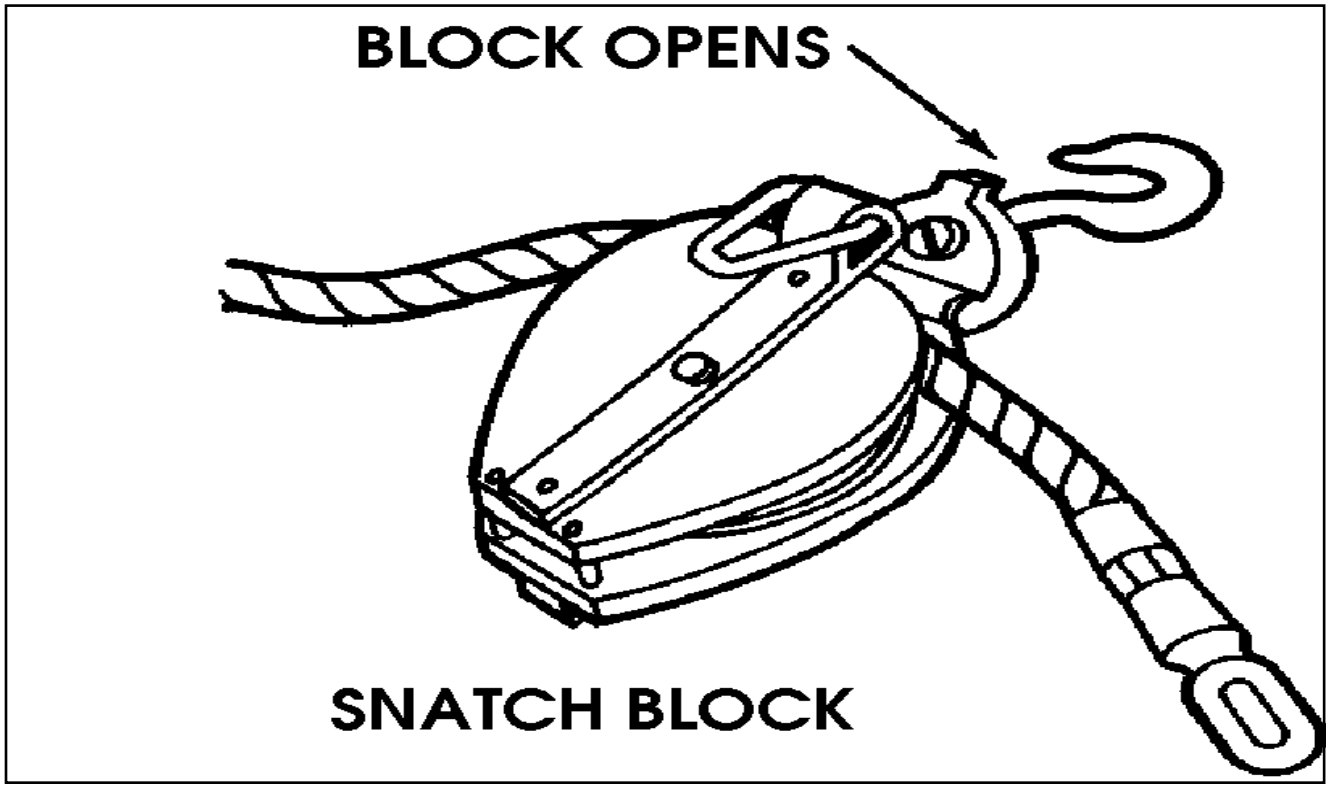
Conventional Block

A conventional block is generally used where it remain in support of a rigging system.



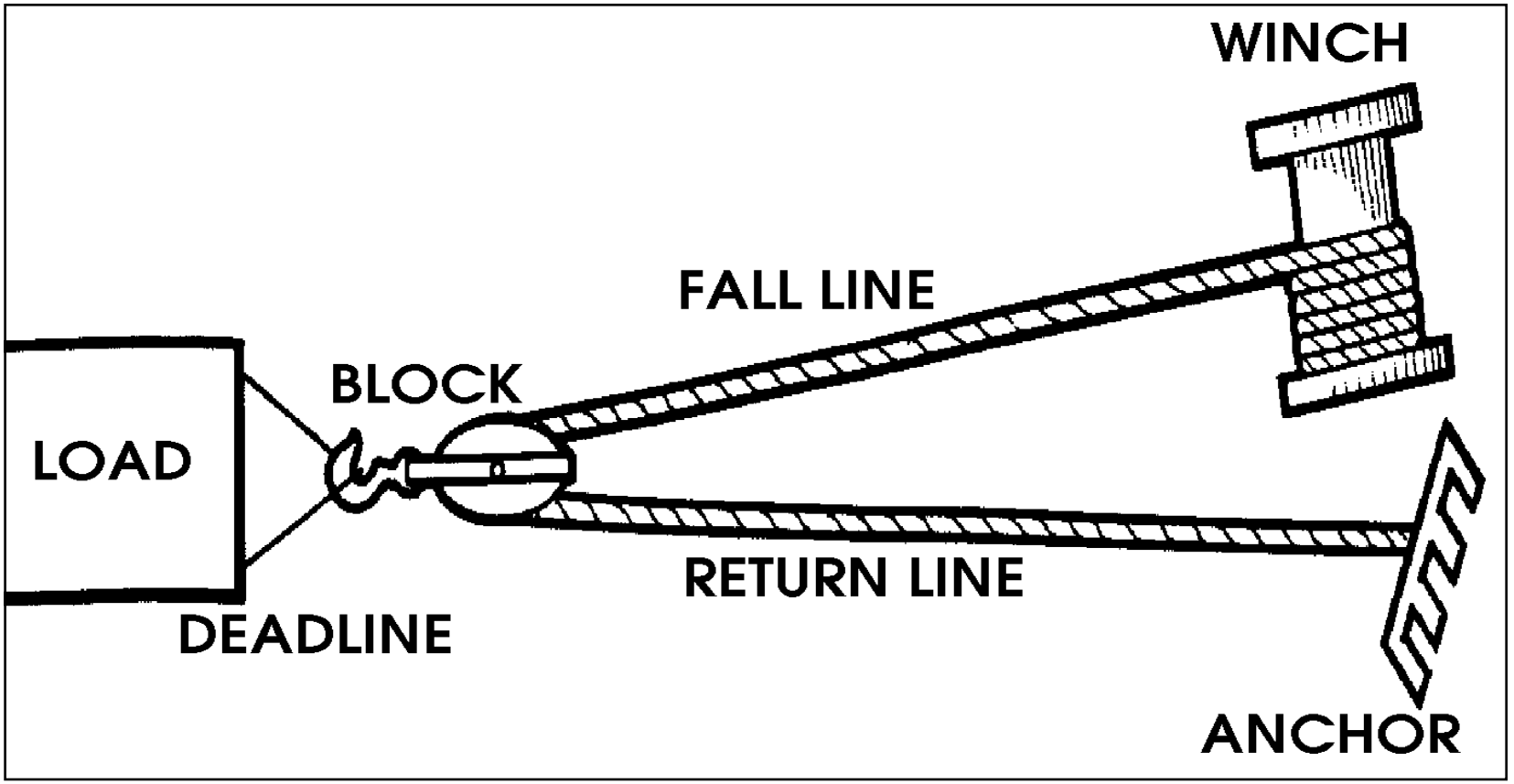
Characteristics and Types of Blocks
Snatch Block

A Snatch block is used where it will not be a pe
part of a tackle system and can be used as requi



Tackle

Tackle is a combination of ropes or cables and blo
used to gain a mechanical advantage.
Simple tackle is one rope or cable with one or mo



Fundamentals of Mechanical Advanta
Overcoming Resistance

- Applying effort to overcome resistance has been
challenge to mankind

- An engine provides the effort to move a truck.

- Energy released be burning a small amount of f
an engine moves a truck weighing thousands of

Mechanical Advantage

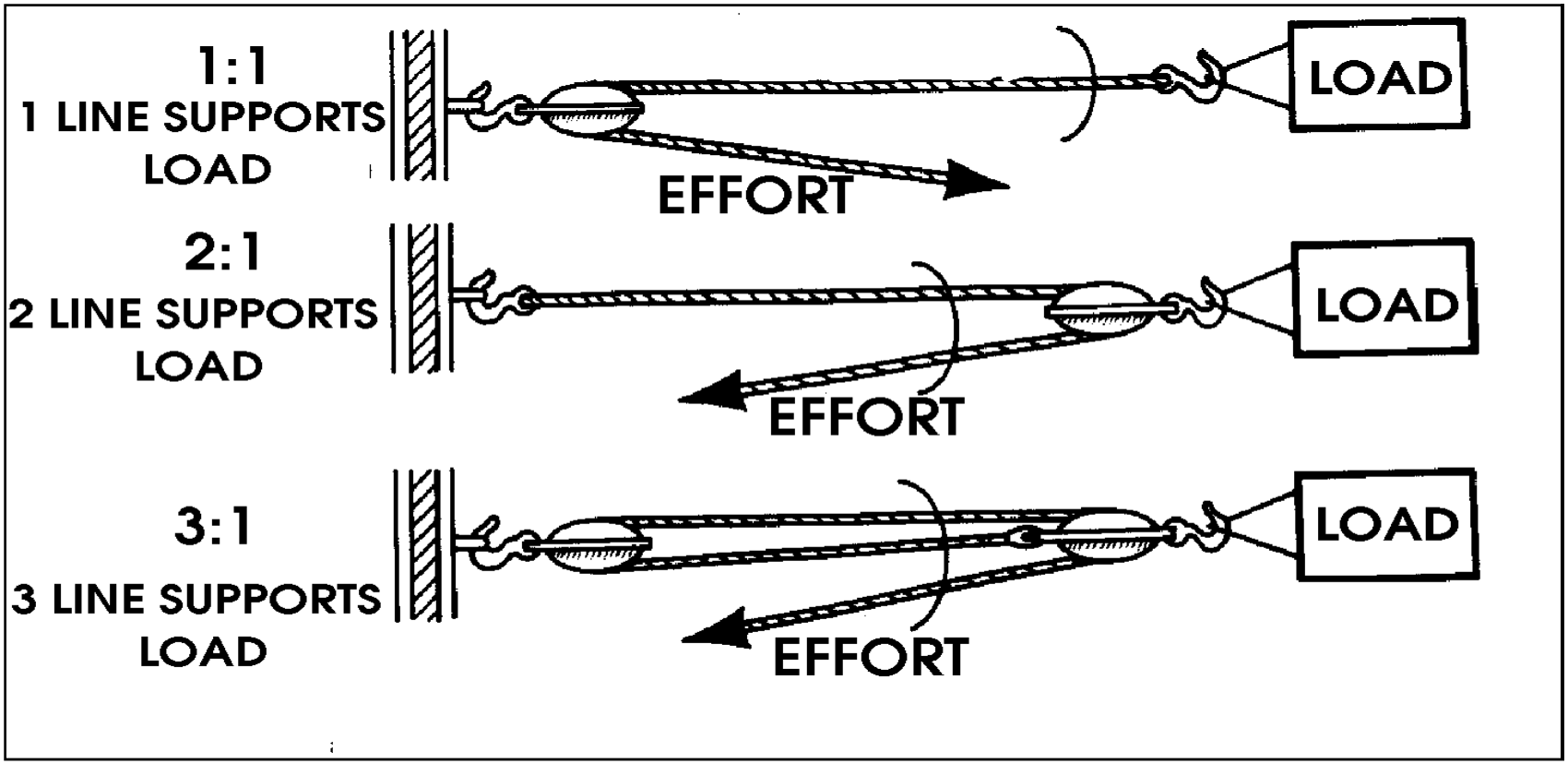
- A mechanical advantage is a small amount of for
over a long distance to move a great load a short

- In other words, a mechanical advantage is the m
of force.

- A mechanical advantage is needed whenever the
resistance is greater than the capacity of the vehi

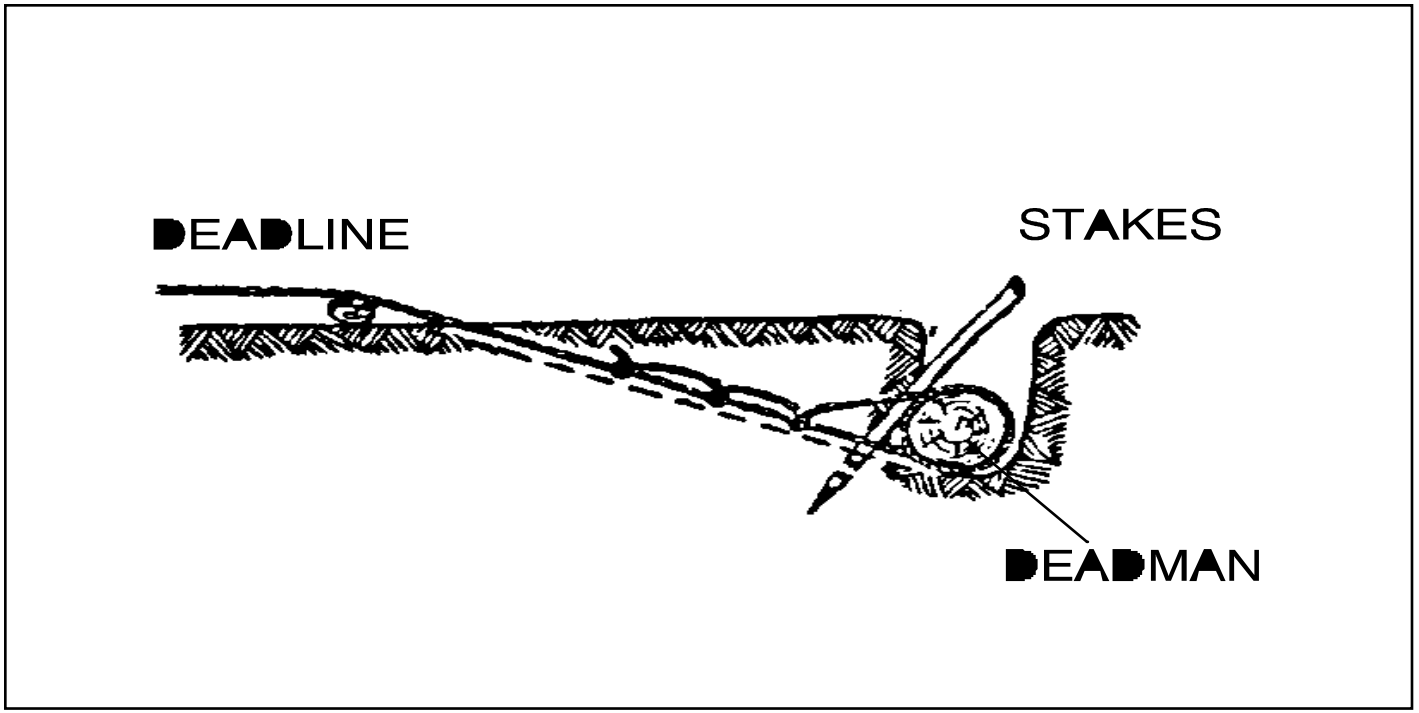
Mechanical Advantage of Tackle

The mechanical advantage of any simple tackle ri
is equal to the number of winch lines supporting t



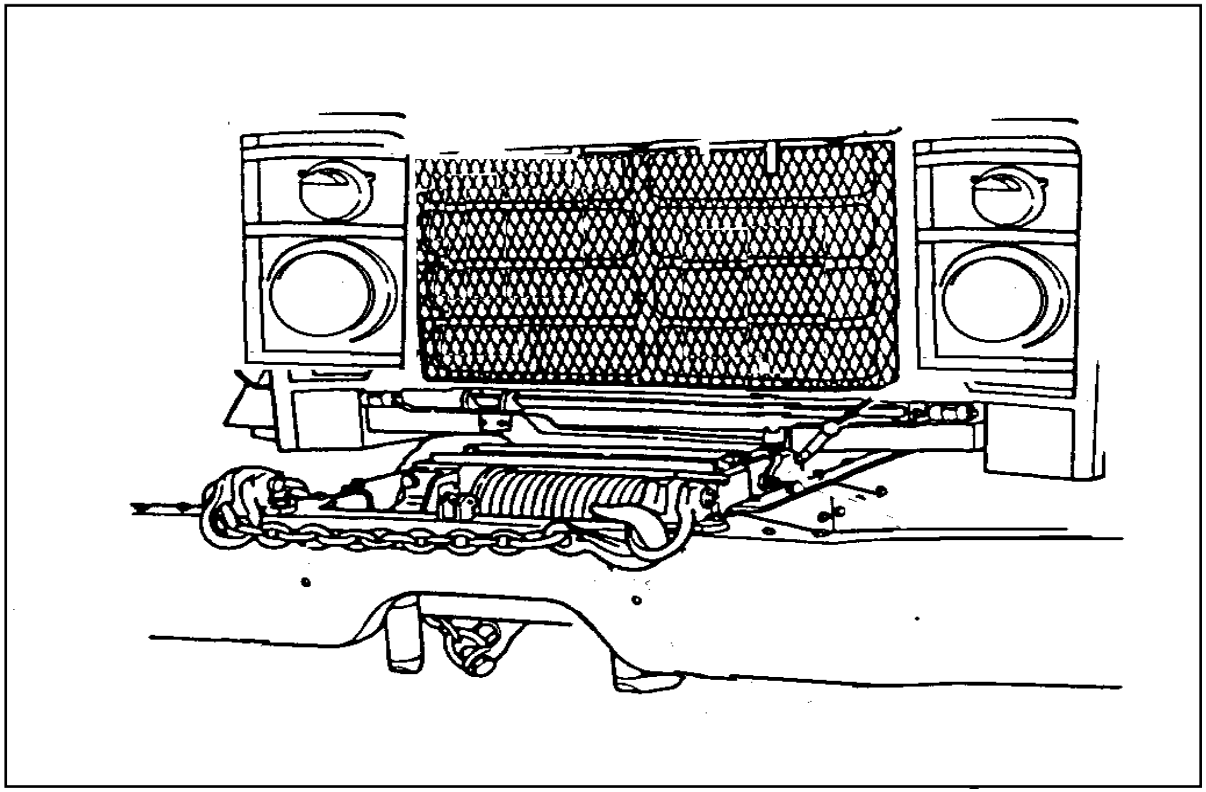
Anchoring Vehicle

- Trees, stumps, or rocks are natural anchors
- Construct anchors when natural ones are not av
- The deadman is one of the best types of constru



Winch Recovery

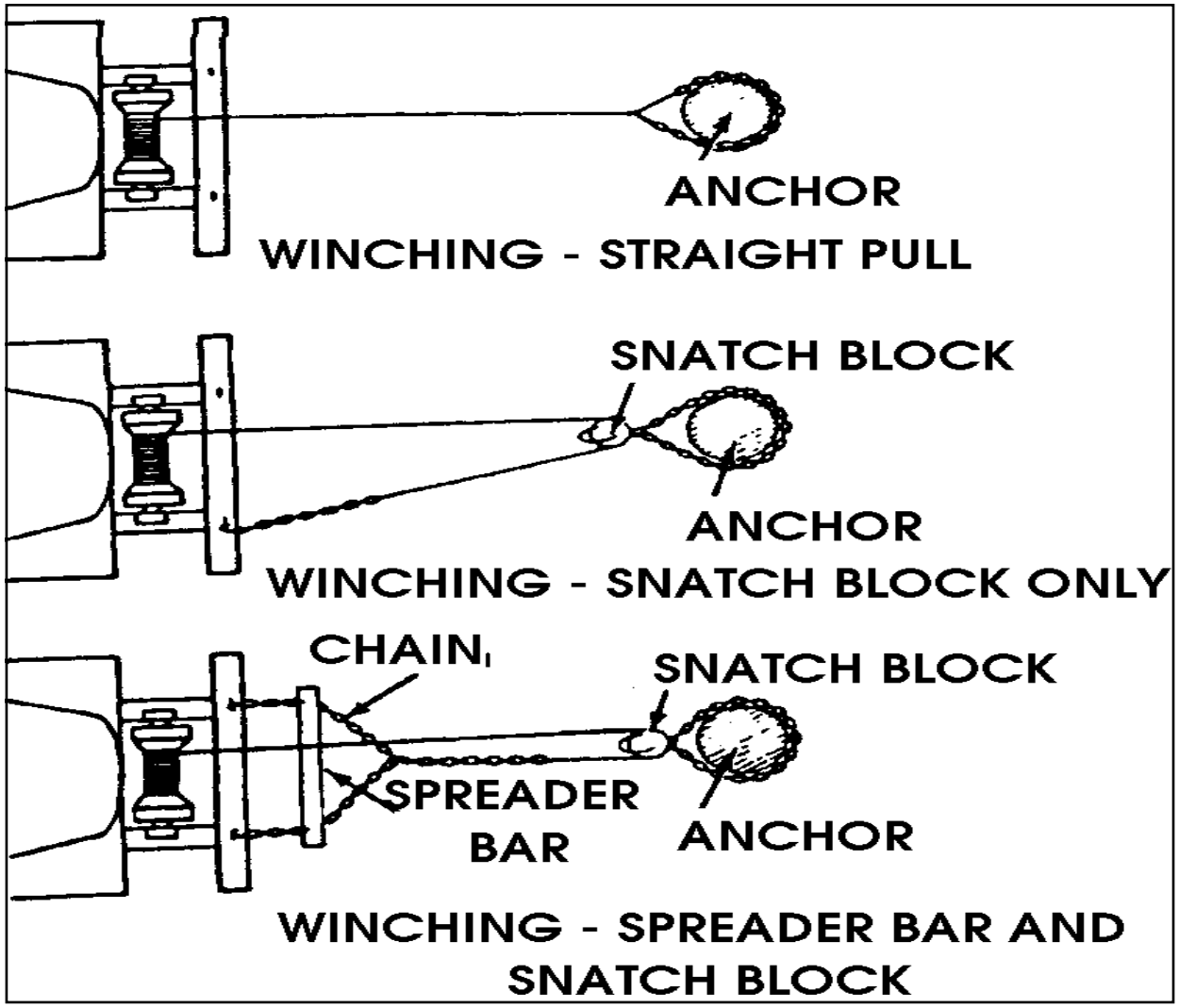
- Many military trucks are equipped with winches
- You need to know how to get the most from a wi
  without endangering personnel or abusing the e



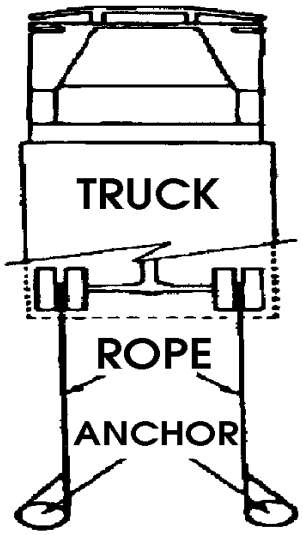
Winch Recovery

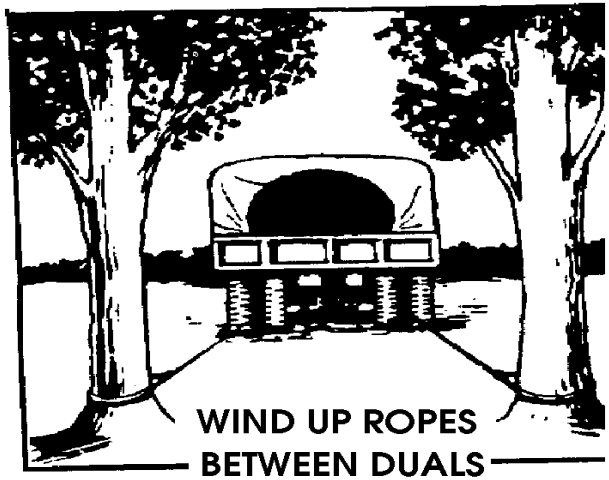
- Check the capacity of your winch
- Check the cable for rust, kinks, and frays
- Estimate the total resistance
- Check your equipment
- Select or provide a suitable anchor
- Rig and check rigging
- Clear personnel

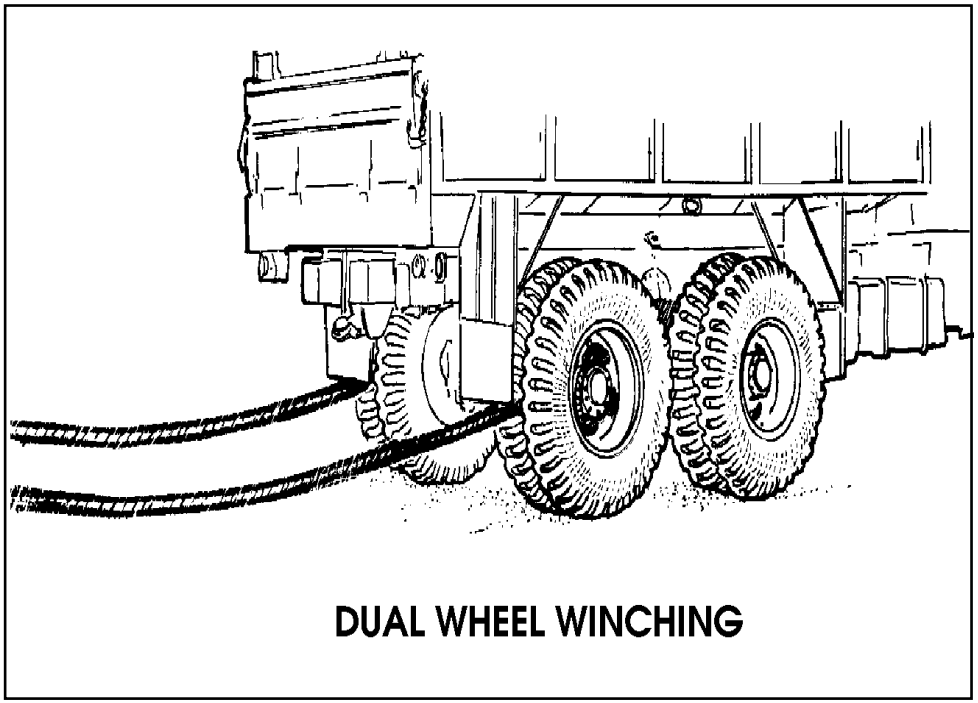
Winch Recovery
Single-vehicle w/ winch



Winch Recovery
Single-vehicle w/o winch

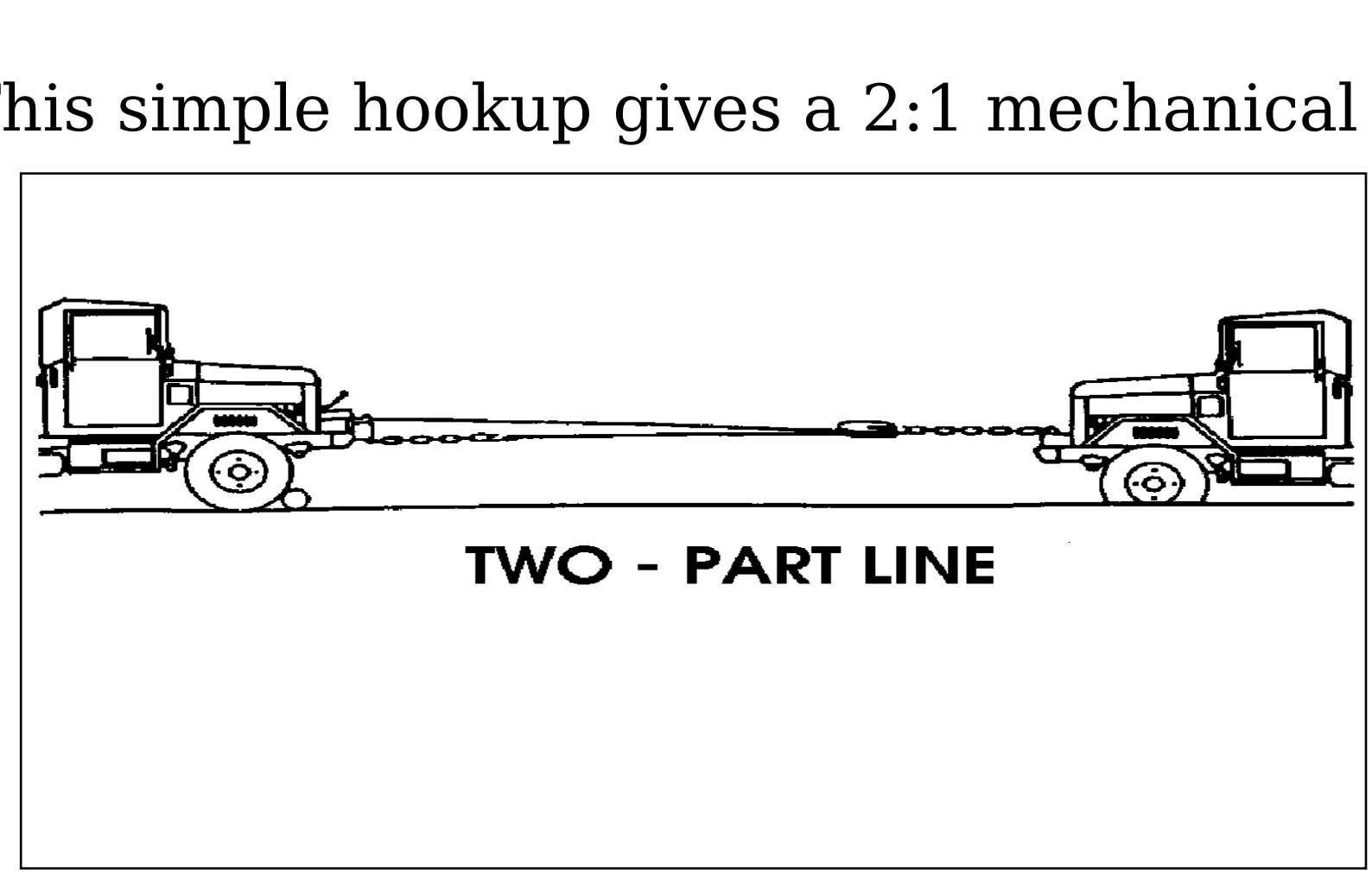






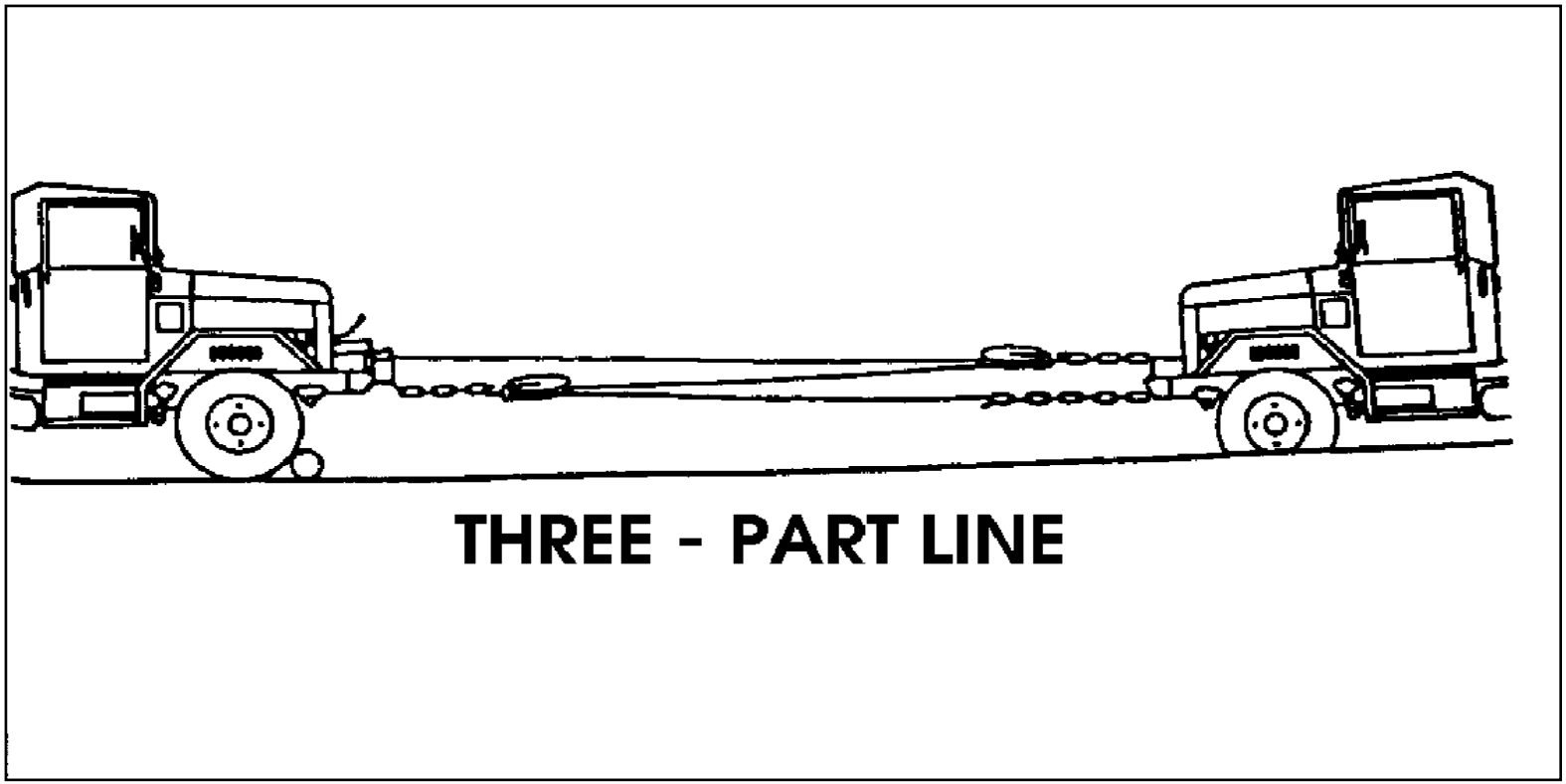
Winch Recovery
Two-vehicle w/ two-part line

This simple hookup gives a 2:1 mechanical adva



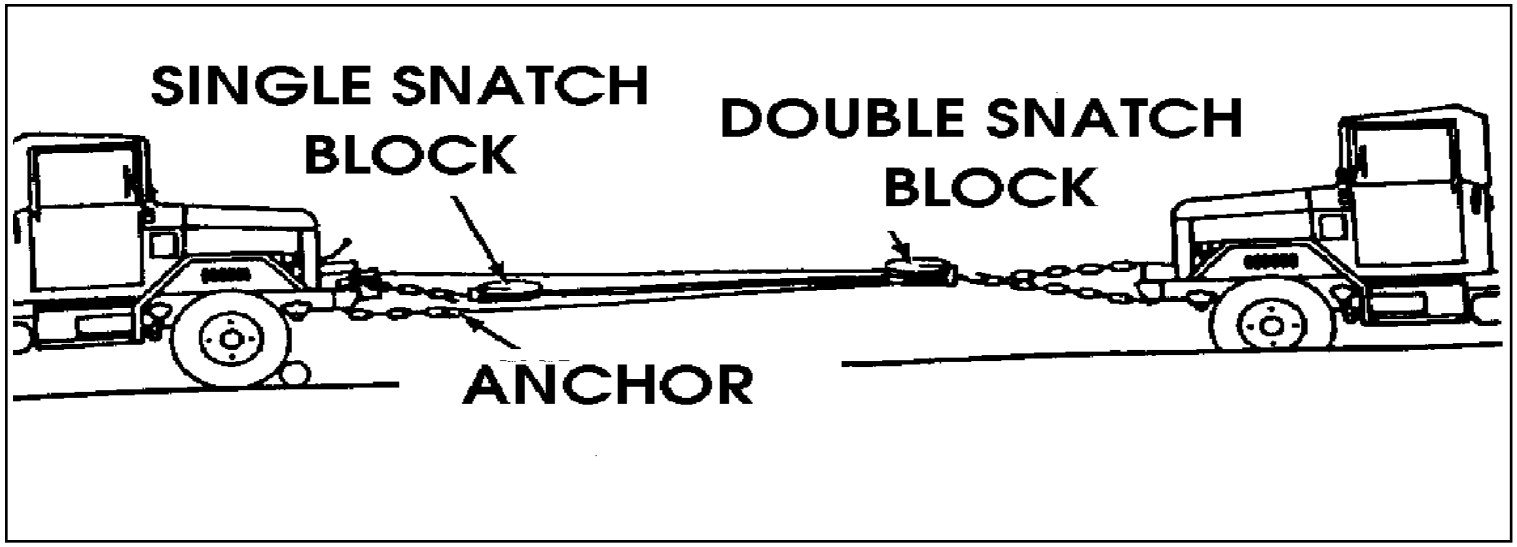
Winch Recovery
Two vehicle with three-part line

get a mechanical advantage of 3:1 use two snatch
locks-one at the load and one on the winch vehicle



Winch Recovery
Two vehicles w/ four-part line

o get a 4:1 mechanical advantage, use two snatch locks-double sheave block for the load and single block for the winch vehicle



Operation of Front Winch

CAUTION!

Do not wind out winch cable when attached to
Load must be wound IN only, except when usin
A-frame kit. Failure to do this will cause damag
the winch brake drum.

Operation of Front Winch
Preparation for Use

Park vehicle directly facing object

Place transmission select lever in “N”

Apply parking brake lever

Turn ignition and battery switches to “OFF.”

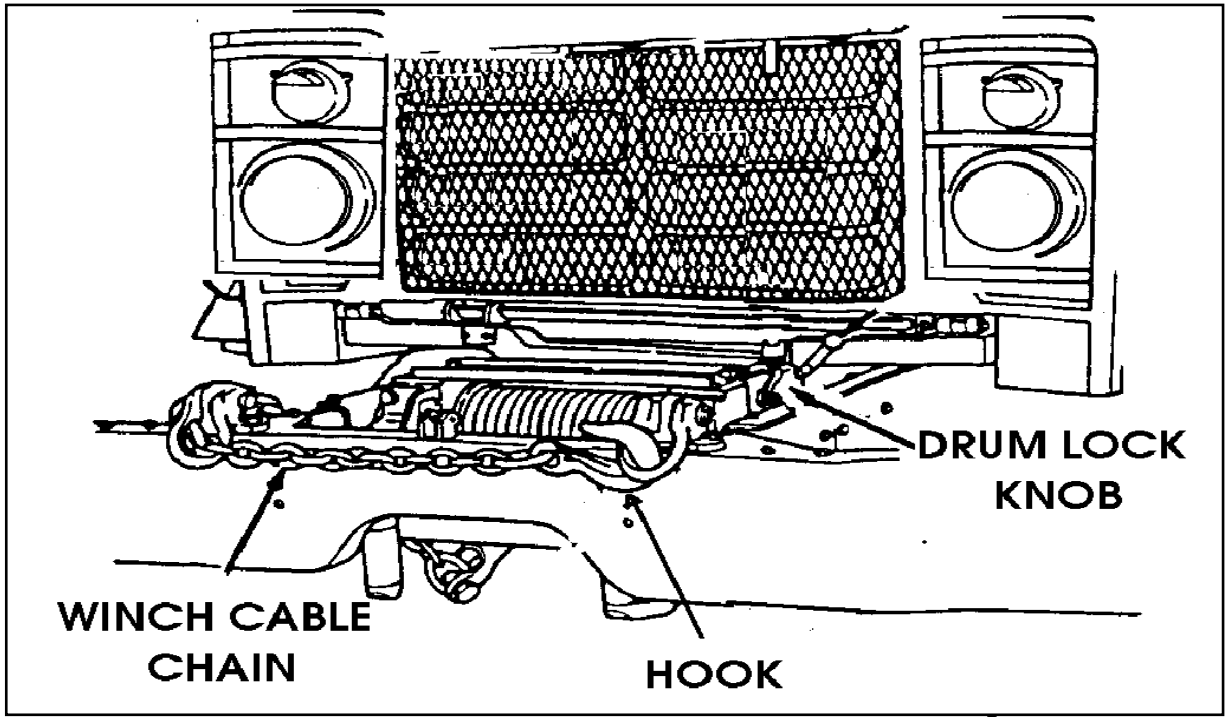
Check oil level in hydraulic reservoir

CAUTION!

Do not proceed with operation if oil level is not in
ED” area on dipstick. Damage to internal componen
will result.

Operation of Front Winch
Unwinding winch cable

- Free winch cable chain, and hook from truck
- Pull out drum lock knob, rotate 90 degrees and r
- Pull out required length of cable. Do not allow ca to knot or kink



WARNING!

Wear hand protective gloves when handling wi

cable. Do not handle with bare hands. Broken

will cause injury.

CAUTION!

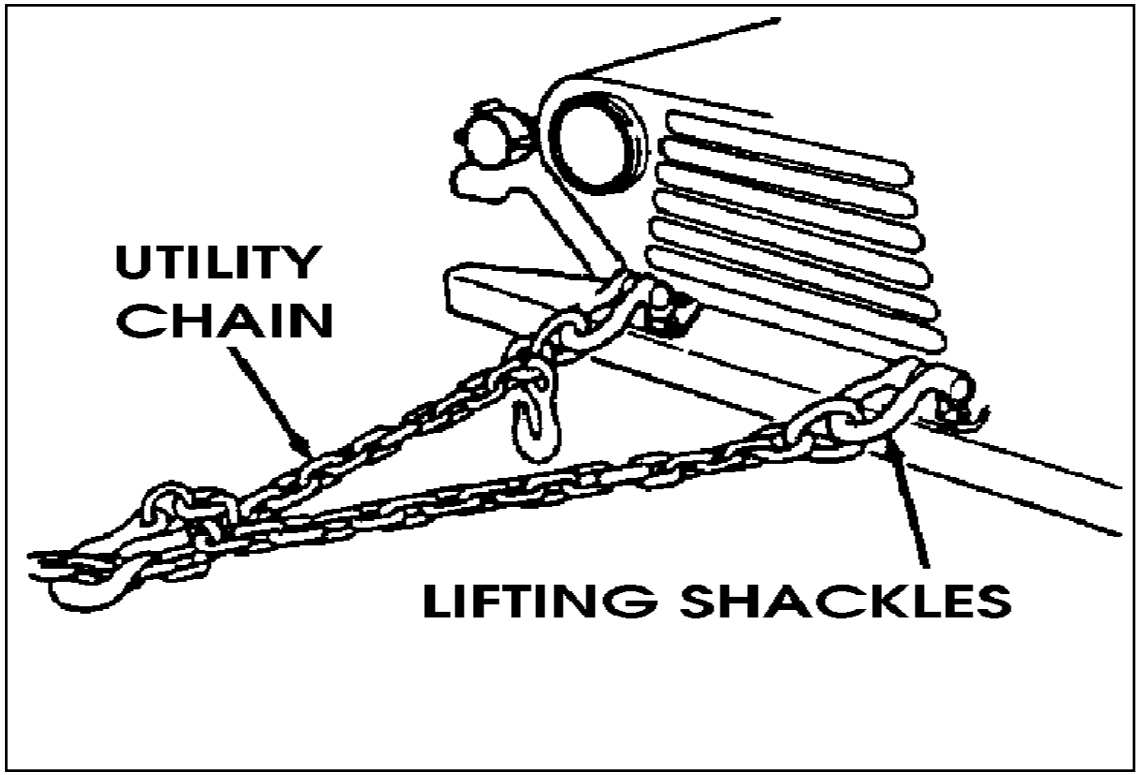
Leave at least four turns of cable on winch drum

Refer to table 1-10 of the TM for winch load cap

Failure to do this will cause damage to winch.

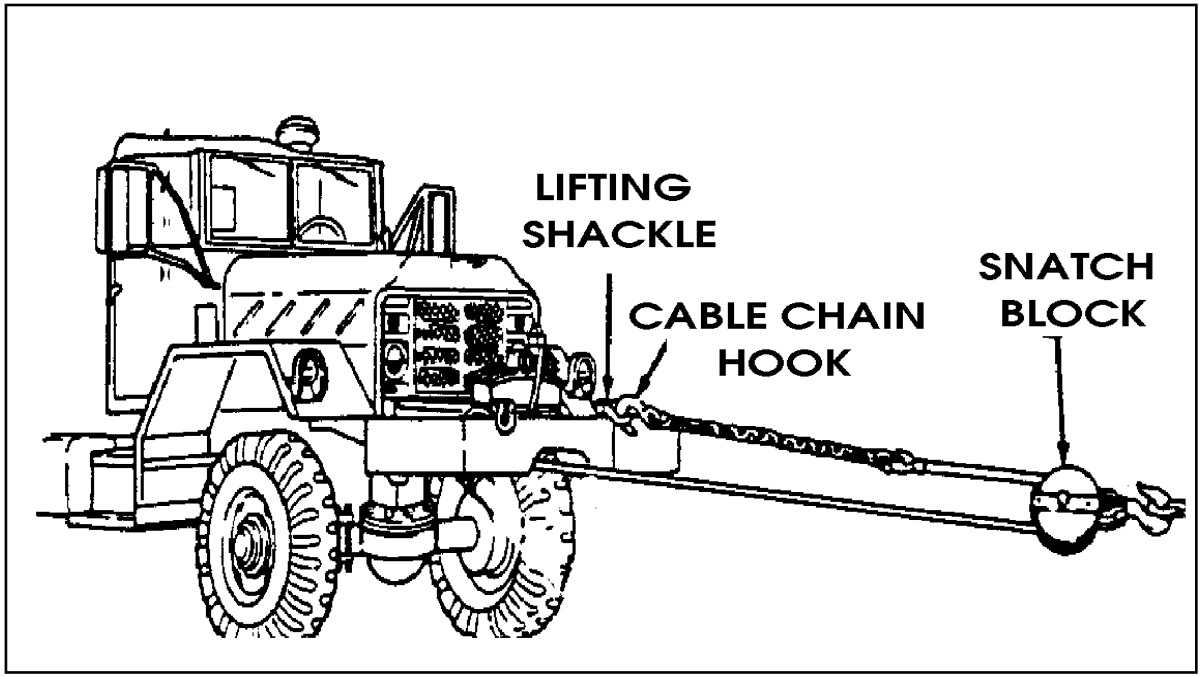
Operation of the Front Winch
Rigging the Load

Attach a utility chain to lifting shackles or pintle h



Operation of the Front Winch
Rigging the Load

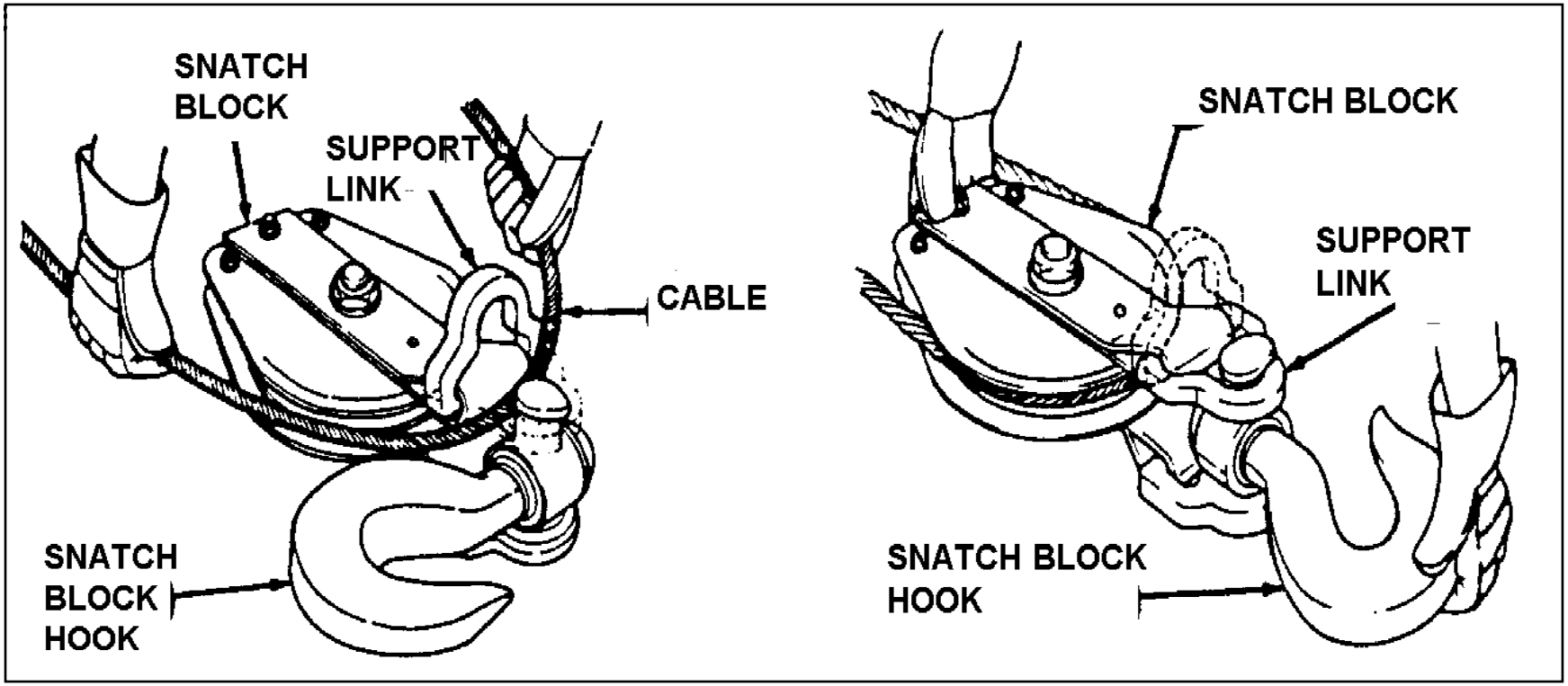
If load is very heavy or deeply mired, install a sn
block to increase winch pulling power.



Rigging the Load

- Turn snatch block to the right
- Lift up rear of snatch block and open suppor
- Insert cable
- Lift up rear of snatch block to lower and locl link to snatch block hook.
- Return snatch block hook to original position
- Attach utility chain to lifting shackles or pint of load.
- Attach snatch block hook to utility chain.

Operation of Front Winch
Rigging the Load



Disengage the brakes, transmission, and transfe
of vehicle being retrieved.

Operation of Front Winch Pulling Load

WARNING!

irect all personnel to stand clear of winch cabl

ing winch operation. A snapped winch cable w

result in injury or death.

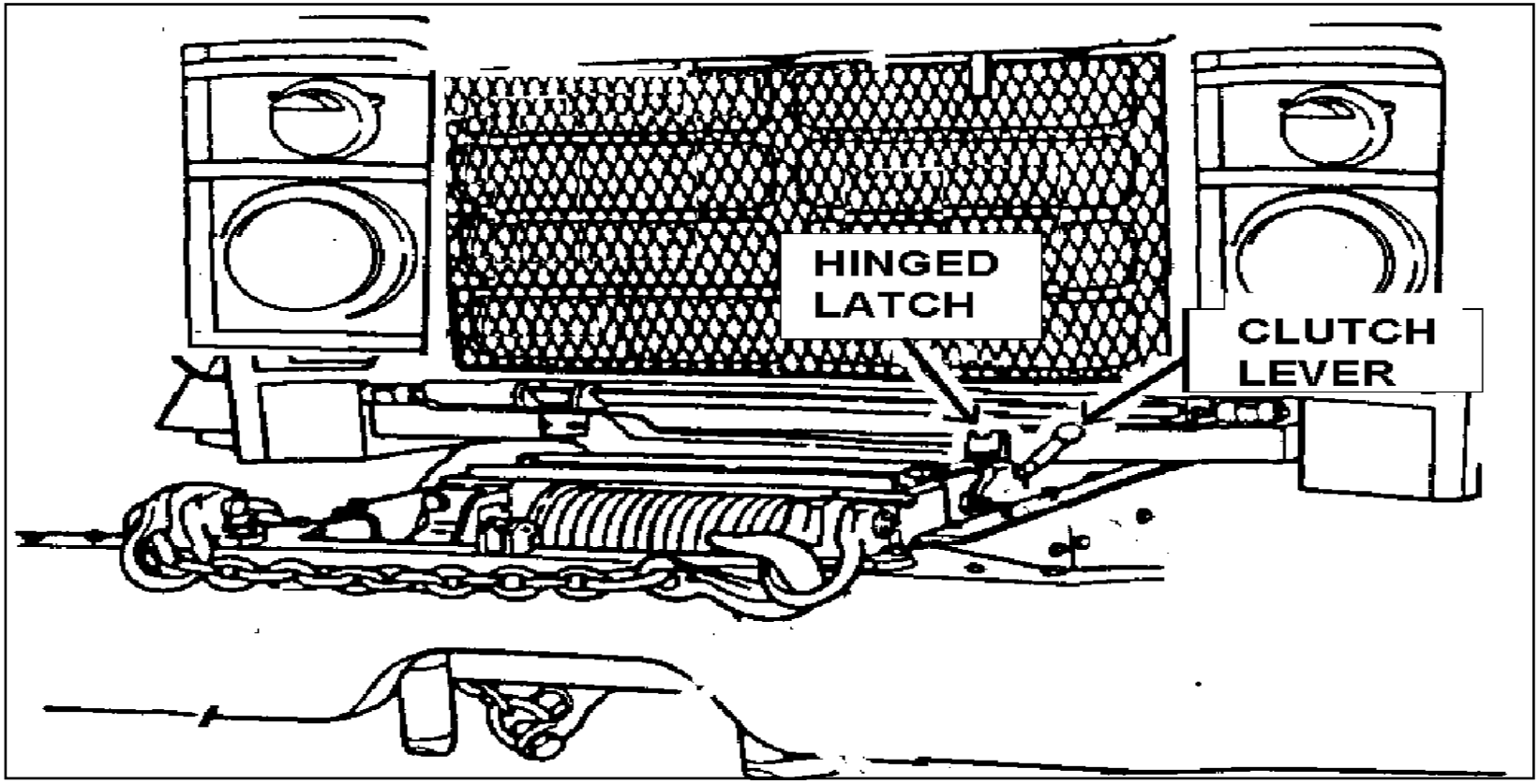
NOTE

Pulling load requires two crewmember

Operation of Front Winch
Pulling Load

Start engine

Release hinged latch and pull clutch lever as far b
as it will go.



Operation of Front Winch Pulling Load

- Press lockout switch and shift transfer case shif

into high range.

- With parking brake applied, place transmission lever in “1-5” (drive) and pull transmission powe control lever back to ENGAGE.
- Return transmission selector takeoff lever to “N
- Pull front winch control lever back to wind and

Winch winding speed and pulling capacity is regu engine RPM.

Operation of Front Winch Pulling Load

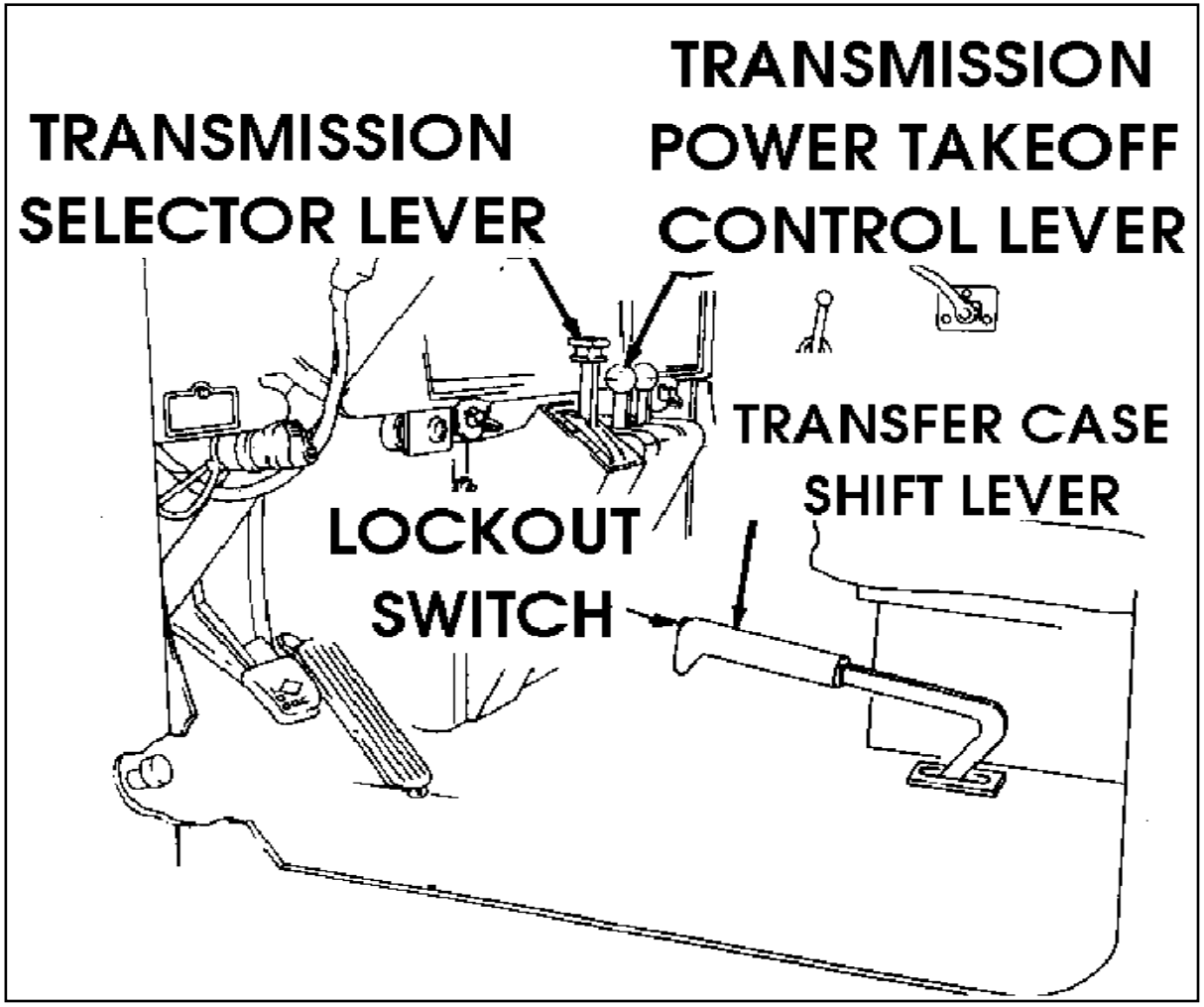
WARNING!

Do not operate winch erratically. Erratic wind
will result in a snapped cable causing injury o

NOTE

Be sure each layer of cable winds evenly

Operation of Front Winch Pulling Load



Operation of Front Winch Pulling Load

Release winch control lever to stop winding. L
will return to neutral when released.

CAUTION!

If temperature is above 70 degrees F (21C), stop
winding operation by releasing winch control lever
er every 100 feet (30.5m) of cable has been winche
Stop operation for six minutes. During this perio
eave truck engine idling and power takeoff control
ver engaged. Failure to do so will cause damage to
winch.

Operation of Front Winch Pulling Indirect Loads

- If vehicle cannot be lined up in a direct line wit

line vehicle up to a reliable go-between object su

as a large tree.

- Unwind enough cable to reach go-between obj

load.

- Attach snatch block to cable.
- Rig utility chain from go-between object to the

block. Attach cable chain to pintle hook or lifting

of load.

Operation of Front Winch Pulling Indirect Loads

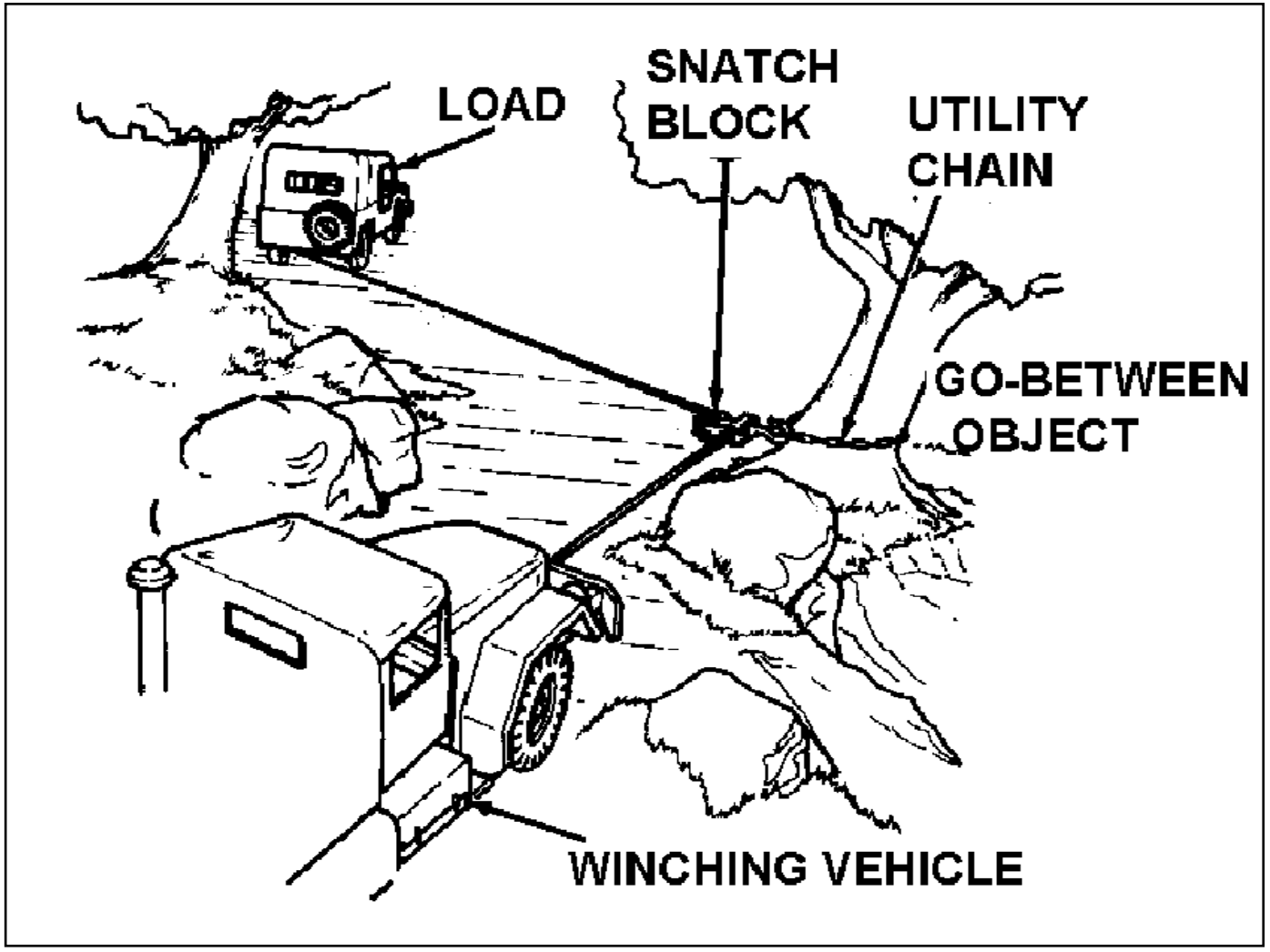
Wind cable. Stop winding when cable chain rea
snatch block

NOTE

If load is on a slope, block wheels of load before
loosening cable.

Briefly push front winch control lever forward to
Cable unwind to loosen (unwind) to permit remo
snatch block. Release winch control lever to neu
Remove snatch block and utility chain
Continue wind operation

Vehicle Recovery



Operation of Front Winch
Lifting and Lowering Loads

An A-Frame is used with front winch for lifting
lowering operations not not exceeding 3000 po

CAUTION!

Do not use winch to payout line loads for any dist
greater than 10 feet. Failure to do this will result
to winch brake drum.

Rig winch cable chain and hook to load.

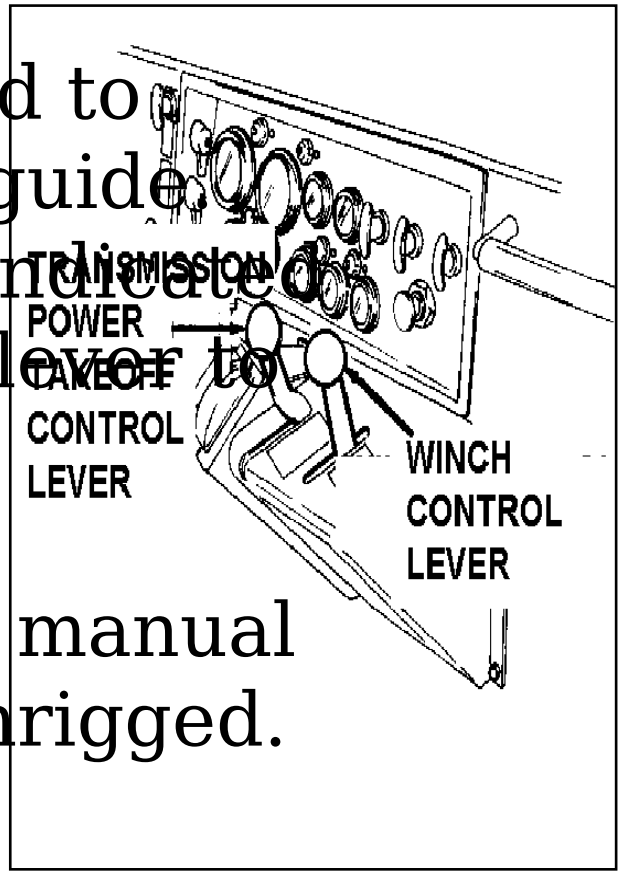
WARNING!

Do not lower load without a ground guide. Direct
personnel to stand clear or lifting operation. Swi
will cause injury or death!

Lifting and Lowering Loads

To lift load, follow same winding instructions as p

To lower load,
Push winch control lever forward to WINCH. Observe directions of guide. After load has been lowered as indicated by guide, release winch control lever to neutral.



Direct crewmember to maintain manual tension on cable while load is unrigged.

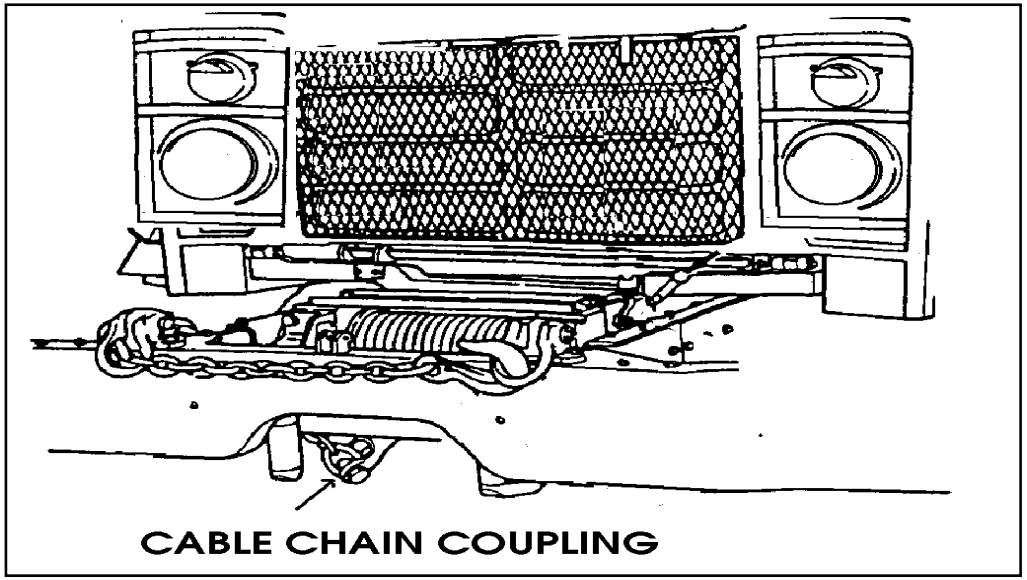
After Winch Operation

Direct crewmember to maintain manual tension o

Pull winch control lever back to WIND.

Watch ground guide for signal indication that cab coupling is approaching drum.

Release winch control lever when signaled by gro



After Winch Operation

Direct crewmember to:

- Disengage drum clutch by pushing clutch
lever toward winch.

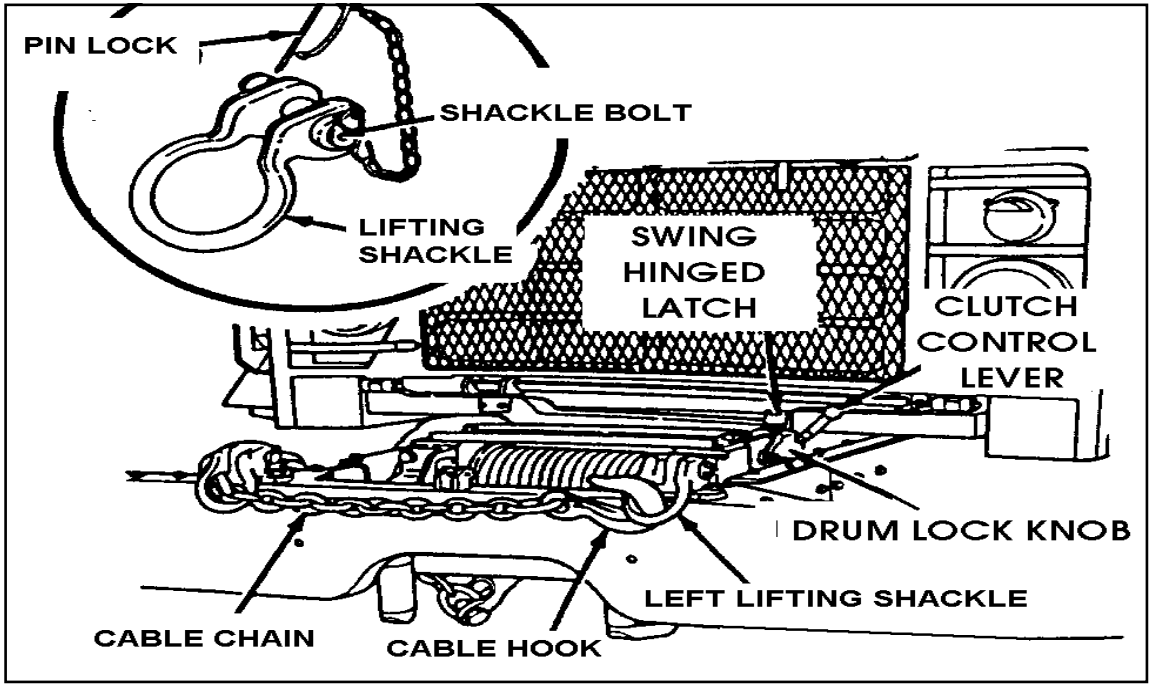
- Swing hinged latch down to lock clutch co
lever in disengaged position.

- Pull out drum lock knob, rotate 90 degrees
release. If necessary, rotate drum by hand to allo
lock plunger to engage.

- Push transmission power takeoff control le
forward to DISENGAGE.

Preparing Winch for Travel

Put cable chain under and over right frame exten
across top of bumper. Attach cable hook to left li
Remove right lifting shackle by unsnapping pin lo
removing shackle bolt. Place chain through liftin
and reinstall shackle.



Winch Safety Cable

- A broken winch line reacts like a whip.
- Use both shackles whenever possible so effort i

equally and damage to the vehicle is minimized.

- Never bend the wire cable at a sharp angle
- Straighten out all kinks and twists as you take
- Do not let tracked vehicles run over the cable.

Winch Safety Cable

WARNING!

Stand clear of a winch cable before it is tightened
being tightened may break and whip back with en
to seriously maim or kill.

After using the winch, have one person or prefera
pull back on the cable while it is wound slowly an
on the drum.

Keep the cable lubricated according to the TM.

Winch Safety
Shear Pin

- When the winch is overloaded, the shear pin b
  protect the cable.
- Never use makeshift shearing of unknown stre
  replace a broken pin.
- Use only authorized replacement pins.
- Do not depend on the shear pin for protection.

Hand and Arm Signals
Pay Out the Winch Cable

The signal to PAY OUT WINCH CABLE is made w
with the arm bent, bringing the the hand in front
The hand is moved down and away from the body
level, circling back to the chest.

The circular back to the chest.

The circular motion is continued
until the signal to stop is given.

Hand and Arm Signals
Inhaul the Winch Cable

The signal to INHAUL THE WINCH CABLE is ma
by pointing at the operator with index finger and
the arm in a circular motion.

Hand and Arm Signals

Stop

The signal to STOP any action that is being perf
given by clasping the hands together with palms
each other at chain level

Summary

- Winching Procedures
- Towing Vehicle
- Block and Tackle Characteristics
- Mechanical Advantage
- Anchoring
- Winch Recovery
- Winch Safety
- Hand and Arm Signals